

CLAIMS:

1. An apparatus for reducing contaminants in a fluid stream, the apparatus comprising at least one light source for producing radiant energy to produce radicals in the fluid stream, whereby the light source is a dielectric barrier excimer discharge lamp.
2. The apparatus according to claim 1 comprises at least one heterogeneous and/or homogeneous catalyst having an upstream end and a downstream end, and at least one surface having a plurality of catalytically active sites on the surface the catalyst positioned such that at least a portion of the fluid stream contacts at least a portion of the catalytically active sites on the surface.
3. The apparatus according to claims 1 or 2, whereby the dielectric barrier excimer discharge lamp comprises a filling gas comprising a noble gas selected from the group of Argon, Krypton and/or Xenon, whereby Xenon is preferred.
4. The apparatus according to claims 1 to 3, whereby the dielectric barrier excimer discharge lamp has filling gas pressure of 50 mbar to 600 mbar.
5. The apparatus according to claims 1 to 4, whereby the dielectric barrier excimer discharge lamp comprises: - 0 weight.-% to 100 weight.-% Argon; and/or - 0 weight.-% to 100 weight.-% Krypton; and/or - 0 weight.-% to 100 weight.-% Xenon; based on the total weight of filling gas in the dielectric barrier excimer discharge lamp.
6. The apparatus according to claims 1 to 5, whereby the dielectric barrier excimer discharge lamp comprises a phosphor material, whereby the phosphor material

is preferably selected from the group of $\text{YPO}_4\text{:Nd}$, $\text{YPO}_4\text{:Bi}$, $\text{YPO}_4\text{:Pr}$, $\text{LuPO}_4\text{:Pr}$ and/or $\text{LaPO}_4\text{:Pr}$, more preferably a mixture thereof .

7. The apparatus according to claims 1 to 6, whereby the dielectric barrier
5 excimer discharge lamp has the maximum emission intensity at a wavelength of between: - 150 nm and 200 nm, preferably 160 nm and 190 nm, more preferably 170 nm and 180 nm; or - 160 nm and 230 nm, preferably 170 nm and 210 nm, more preferably 175 nm and 190 nm; or - 220 nm and 250 nm, preferably 225 nm and 249 nm, more preferably 230 nm and 248 nm.

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8. The apparatus according to claims 1 to 7, whereby the dielectric barrier excimer discharge lamp is pulsed operated.

9. The apparatus according to claims 1 to 8, having a combustion chamber
15 with a precombustion gas stream to the combustion chamber and a postcombustion gas stream of exhaust from the combustion chamber, wherein at least one dielectric barrier excimer discharge lamp is positioned in the precombustion gas stream.

10. Use of an apparatus according to claims 1 to 9 for treating fluid stream to
20 reduce the concentration of at least one pollutant of a fluid, preferably for treating an exhaust gas stream from the combustion of a fuel in an engine to reduce the concentration of at least one pollutant of said gas stream, more preferably reduce the concentration of at least one pollutant of the fluid of an fuel cell.